WHAT IS CLAIMED IS:

1. A method of making probe chips comprising the steps of:

forming a plurality of probe arrays on a substrate;

separating said substrate into a plurality of chips, each of said chips comprising at least one probe array thereon; and

mating at least one of said chips to a package, said package comprising a reaction chamber, said reaction chamber comprising inlets for flowing fluid therein, said at least one probe array in fluid communication with said reaction chamber.

2. The method as recited in claim 1 wherein said package is made by the steps of:

injection molding first and second halves of said package; and

mating said first and second halves together.

3. The method as recited in claim 2 wherein one of said halves comprises flow channels therein, said flow channels in communication with said inlets.

4. The method as recited in claim 3 further comprising the step of applying a reenterable seal to flow channels in said package.

5. The method as recited in claim 1 wherein said substrate comprises alignment marks for forming said probe arrays thereon in a desired position, and wherein said alignment marks are used to identify locations for said separating of said substrate into chips.

6. The method as recited in claim 1 wherein said package comprises an alignment structure thereon, wherein said step of mating said chip to said package uses said alignment structures to position said package at a desired position.

7. The method as recited in claim 1 wherein said package comprises an alignment structure thereon, and further comprising the step of identifying the location of at least one target on said probe array in a scanner, wherein said package is placed at a desired location in said scanner using said alignment structure.

8. The method as recited in claim 1 wherein said step of forming a plurality of probe arrays comprises the steps of:

selectively exposing said substrate to light;

coupling selected monomers to said substrate where said substrate has been exposed to light.

9. The method as recited in claim 1 wherein said step of separating comprises the steps of:

scribing said substrate in desired locations;

breaking said substrate along said scribe lines.

10. The method as recited in claim 1 wherein said step of forming a plurality of probe arrays on said substrate is a step of forming a plurality of oligonucleotide probe arrays on said substrate.

11. The method as recited in claim 10 further comprising the steps of flowing labeled oligonucleotide target molecules through said reaction chamber and identifying where said target molecules have bound to said substrate.

12. The method as recited in claim 11 wherein said package comprises a temperature probe and further comprising the step of monitoring and adjusting a temperature in said reaction chamber.

13. The method as recited in claim 1 wherein said package is formed by the steps of:

forming first and second package portions; and

acoustically welding said first and second package portions together.

14. The method as recited in claim 1 wherein said step of mating said chips to packages comprises the step of binding said chips to said package with an adhesive.

15. The method as recited in claim 14 wherein said packages comprise a recessed region thereon, whereby said chips do not extend above a surface of said packages.

16. The method as recited in claim 1 further comprising the step of flowing target molecules through said reaction chamber.

17. An apparatus for packaging a substrate, said apparatus comprising:

a substrate having a first surface and a second surface, said first surface comprising a probe array;

a body having a mounting surface with a fluid cavity, said second surface attached to said cavity; and

a cover attached to said mounting surface for sealing said cavity.

18. The apparatus of claim 17 wherein said cavity comprises an inlet port and an outlet port, said inlet and outlet ports permitting fluids to circulate into and through said cavity.

19. The apparatus of claim 18 wherein said inlet and outlet ports comprise a reenterable seal.

20. The apparatus of claim 17 wherein said probe array comprises an array of oligonucleotide probes.

21. An apparatus for packaging a substrate, said apparatus comprising:

a substrate having a first surface and a second surface, said first surface comprising a probe array and said second surface being an outer periphery of said first surface;

a body having a mounting surface, an upper surface, and a cavity bounded by said mounting surface and said upper surface, said second surface being attached to said cavity and said first surface being within said cavity; and

a cover attached to said mounting surface for defining an upper boundary to said cavity;

wherein said cavity comprises a diffuser and a concentrator, said diffuser and said concentrator permitting laminar fluid flow through said cavity.

22. The apparatus of claim 21 wherein said probe array comprises an array of oligonucleotide probes.

23. The apparatus of claim 21 wherein said cover comprises a depression for receiving a temperature control element to maintain a reaction temperature in said cavity.

24. The apparatus of claim 21 wherein said cover comprises a first half mated to a second half.

25. The apparatus of claim 24 wherein said first half comprises a first channel and a second channel, said first channel being in fluid communication with said diffuser and said second channel being in fluid communication with said concentrator.

26. The apparatus of claim 25 wherein said second half comprises a third channel and a fourth channel, said third channel being in fluid communication with said first channel, and said fourth channel being in fluid communication with said second channel. .

27. The apparatus of claim 26 wherein said first channel and said second channel comprise re-enterable seals for sealing fluid in said cavity.

28. An apparatus for mixing a fluid, the apparatus comprising:

a first substrate comprising a first inner surface functionalized with a microarray of reactive moieties;

a substantially parallel second substrate also comprising a second inner surface, wherein said first and second inner surfaces bound a closed chamber there between, said chamber adapted to retain a quantity of fluid so that the fluid is in contact with both surfaces;

at least one bubble disposed within said chamber; and

means for moving the chamber so that the bubble moves relative to the fluid to effect mixing of the fluid.

29. An apparatus for mixing a fluid, the apparatus comprising:

a first substrate comprising a first inner surface functionalized with a microarray of reactive moieties;

a substantially parallel second substrate also comprising a second inner surface, wherein said first and second inner surfaces bound a closed chamber there between, said chamber adapted to retain a quantity of fluid so that the fluid is in contact with both surfaces;

at least one bubble disposed within said chamber, wherein said bubble is a magnetic

particle; and

means for moving the bubble relative to the fluid to effect mixing of the fluid.

30. The apparatus of claim 28, wherein the closed chamber has a thickness of less than about 2 millimeters.

31. The apparatus of claim 29, wherein the closed chamber has a thickness of less than about 2 millimeters.

32. The apparatus of claim 28, wherein both inner surfaces are functionalized with reactive moieties.

33. The apparatus of claim 29, wherein both inner surfaces are functionalized with reactive moieties.

34. The apparatus of claim 28, wherein the bubble comprises a gas.

35. The apparatus of claim 28, wherein the bubble comprises nitrogen.

36. The apparatus of claim 29, wherein said magnetic particle is a magnetic bead.

37. The apparatus of claim 28, wherein the bubble is produced by introducing a volume of the fluid that is less than the total volume of the closed chamber.

38. The apparatus of claim 28, further including a flexible seal between the inner surface of the first substrate and the inner surface of the second substrate.

39. The apparatus of claim 38, wherein said flexible seal includes a gasket.

40. The apparatus of claim 29, further including a flexible seal between the inner surface of the first substrate and the inner surface of the second substrate.

41. The apparatus of claim 40, wherein said flexible seal includes a gasket.

42. The apparatus of claim 28, further comprising means for introducing fluid into the closed chamber.

43. The apparatus of claim 29, further comprising means for introducing fluid into the closed chamber.

44. The apparatus of claim 28, wherein the first substrate and the second substrate are individually comprised of a material selected from the group consisting of glass, silicon, fused silica, plastic, and a combination thereof.

45. The apparatus of claim 29, wherein the first substrate and the second substrate are individually comprised of a material selected from the group consisting of glass, silicon, fused silica, plastic, and a combination thereof.

46. The apparatus of claim 28, wherein the first substrate is comprised of glass.

47. The apparatus of claim 29, wherein the first substrate is comprised of glass.

48. The apparatus of claim 28, wherein the means for moving the bubble is selected from the group consisting of rotating the apparatus about an axis, rolling the apparatus, and reciprocally shaking the apparatus.

49. A method for mixing a fluid, comprising:

providing an apparatus according to claim 28;

introducing a fluid into the closed chamber;

introducing a bubble within the fluid; and

moving the bubble in the fluid to effect mixing of the fluid.

50. A method for mixing a fluid, comprising:

providing an apparatus according to claim 29;

introducing a fluid into the closed chamber;

introducing a bubble within the fluid; and

moving the bubble in the fluid to effect mixing of the fluid.

51. A method for mixing a fluid, comprising:

providing an apparatus according to claim 30;

introducing a fluid into the closed chamber,

introducing a bubble within the fluid; and

moving the bubble in the fluid to effect mixing of the fluid.

52. A method for mixing a fluid, comprising:

providing an apparatus according to claim 31;

introducing a fluid into the closed chamber;

introducing a bubble within the fluid; and

moving the bubble in the fluid to effect mixing of the fluid.

53. A method for mixing a fluid, comprising:

providing an apparatus according to claim 36;

introducing a fluid into the closed chamber;

introducing a bubble within the fluid; and

moving the bubble in the fluid to effect mixing of the fluid.

54. A method for mixing a fluid, comprising:

providing an apparatus according to claim 48;

introducing a fluid into the closed chamber;

introducing a bubble within the fluid; and

moving the bubble in the fluid to effect mixing of the fluid.

55. An apparatus for mixing a fluid, comprising:

a first substrate and a second substrate having inner surfaces that define a closed chamber therebetween, said chamber adapted to retain a quantity of fluid so that the fluid is in contact with both inner surfaces;

means for creating bubbles in the fluid within the apparatus, whereby each bubble displaces the fluid resulting in mixing; and

means for moving a bubble in the fluid.

56. The apparatus of claim 55, wherein the first substrate comprises a material selected from the group consisting of glass, silicon, fused silica, and plastic.

57. An apparatus for mixing a fluid, comprising:

a first substrate and a substantially parallel second substrate having inner surfaces that define a closed chamber therebetween, said chamber adapted to retain a quantity of fluid so that the fluid is in contact with both inner surfaces;

means for providing bubbles in the fluid within the apparatus, whereby each said bubble displaces the fluid resulting in mixing; and

means for moving a bubble in the fluid.

58. An apparatus for mixing a fluid, comprising:

a first substrate and a second substrate having inner surfaces that define a closed chamber therebetween, said chamber adapted to retain a quantity of fluid so that the fluid is in contact with both inner surfaces; and

means for creating bubbles in the fluid at selected locations within the apparatus, whereby each bubble displaces the fluid resulting in mixing; and wherein at least one of said inner surfaces is functionalized with reactive moieties.

59. The apparatus of claim 58 wherein the reactive moieties comprise monomeric species covalently bound to said inner surface, each of the monomeric species having at least one reactive site.

60. The apparatus of claim 59 wherein the monomeric species are nucleotides.

61. The apparatus of claim 60 wherein the monomeric species are amino acids.

62. The apparatus of claim 61 wherein the reactive moieties comprise reactive sites of monomeric species present at the terminus of a surface-bound polymer.

63. The apparatus of claim 62 wherein the surface-bound polymer comprises a polynucleotide.

64. The apparatus of claim 62 wherein the surface-bound polymer comprises a polyribonucleotide.

65. The apparatus of claim 64, wherein the surface-bound polymer comprises a polypeptide.

66. A method comprising:

providing a first substrate and a second substrate having inner surfaces that define a closed chamber therebetween, said chamber adapted to retain a quantity of fluid so that the fluid is in contact with both inner surfaces, and wherein at least one of said inner surfaces is functionalized with polynucleotides, polypeptides, or polysaccharides;

introducing a fluid containing a plurality of components into the closed chamber so as to provide a quantity of fluid therein in contact with both inner surfaces;

providing a bubble in the fluid; and

moving a bubble within the fluid to result in mixing.

67. A method according to claim 66, wherein the polynucleotide is a polyribonucleotide.

68. A method according to claim 66, wherein the chamber is adapted to retain a film of fluid in contact with both inner surfaces.

69. A method according to claim 66 wherein the inner surfaces of the first and second substrates are substantially parallel.

70. A method according to claim 66, wherein the chamber is less than two millimeters in thickness.

71. A method according to claim 66 further including using heat for said mixing.

72. A method according to claim 66 further including using ultrasonic radiation for said mixing.

73. A method of claim 66, wherein the at least one of said inner surfaces is functionalized with polynucleotides.

74. A method of 66, wherein the at least one of said inner surfaces is functionalized with polypeptides.

75. A method comprising:

providing a first substrate and a second substrate having inner surfaces that define a closed chamber therebetween, said chamber adapted to retain a quantity of fluid so that the fluid is in contact with both inner surfaces, and wherein at least one of said inner surfaces is functionalized with an array of RNA or DNA probes;

introducing a fluid sample containing DNA or RNA into the closed chamber so as to provide a quantity of fluid therein in contact with both inner surfaces;

providing a bubble in the fluid;

moving a bubble within the fluid to result in mixing;

after hybridization is complete, removing the sample from the apparatus; and

analyzing the functionalized inner surface for DNA or RNA that has hybridized.

76. A method according to claim 75 additionally comprising heating the DNA or RNA containing sample fluid while in the closed chamber.

77. A method according to claim 76 additionally comprising washing the functionalized inner surface prior to the analyzing.

78. A method according to claim 75, wherein the bubble is moved in a circular pattern.

79. A method according to claim 78, wherein the bubble is moved in the circular pattern that includes exiting the closed chamber.

80. A method comprising:

providing a first substrate and a second substrate having inner surfaces that define a closed chamber therebetween, said chamber adapted to retain a quantity of fluid so that the fluid is in contact with both inner surfaces, and wherein at least one of said inner surfaces is functionalized with an immobilized biological polymer;

introducing a fluid containing a plurality of components into the closed chamber so as to provide a quantity of fluid therein in contact with both inner surfaces;

providing a bubble in the fluid; and

moving a bubble within the fluid to result in mixing.

81. A method according to claim 80, wherein said biological polymer includes a polynucleotide.

82. A method according to claim 81, wherein said polynucleotide is a polyribonucleotide.

83. A method according to claim 80, wherein said biological polymer includes polypeptides.

84. A method according to claim 80, wherein said biological polymer includes polysaccharides.

85. A method for mixing a film of fluid, comprising:

providing a first substrate and a substantially parallel second substrate having inner surfaces that define a closed chamber therebetween, said chamber adapted to retain a quantity of fluid so that the fluid is in contact with both inner surfaces;

introducing a fluid containing a plurality of components into the closed chamber so as to provide a film of fluid therein; and

nucleating a bubble within the film of fluid, whereby, as the bubble is nucleated and dispelled, the fluid is displaced resulting in mixing.

86. The method of claim 85, wherein the dispelling comprises moving the bubble.

87. An apparatus for mixing a fluid, comprising:

a first substrate and a second substrate having inner surfaces that define a closed chamber therebetween, said chamber adapted to retain a quantity of fluid so that the fluid is in contact with both inner surfaces;

means for nucleating bubbles in the fluid comprising discrete sources for creating individual bubbles at selected locations within the apparatus, whereby, as each bubble is nucleated and dispelled, the fluid is displaced resulting in mixing; and

means for moving a bubble in the fluid.